

What is claimed is:

1. A radio communication system comprising a network structure which arranges a plurality of node devices each having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, and a management device for managing the network via at least one of the node devices, wherein:

the node device comprises:

a GPS device for inputting GPS information which is sent from a GPS satellite and received by a GPS antenna;

transmission means for sending position information generated by the GPS device to the management device; and

control means for receiving a control signal generated by the management device according to the position information and controlling respective sections of the radio unit according to the control signal; and

the management device comprises:

control signal generation means which receives the position information from the node device and generates the control signal for controlling respective sections of the node device according to the position information; and

control signal transmission means which sends the generated control signal to a pertinent node device.

2. The radio communication system according to claim 1, wherein:

the radio unit is configured of an outdoor device disposed outdoors and an indoor device disposed indoors and connected to the outdoor device through a coaxial cable;

the GPS antenna is installed outdoors; and

the GPS information received by the GPS antenna is input to the GPS device via the outdoor device, the coaxial cable and the indoor device.

3. The radio communication device according to claim 2, wherein:
 - the outdoor device comprises multiple separation means which superimposes the GPS information received by the GPS antenna on a communication signal to an adjacent node device and sends to the coaxial cable, and
 - the indoor device comprises multiple separation means which separates the GPS information from the signal being sent through the coaxial cable and inputs to the GPS device.
4. The radio communication system according to claim 1, wherein the GPS antenna is installed indoors and the GPS information received by the PGS antenna is directly input to the GPS device.
5. The radio communication system according to claim 1, wherein the node device comprises clock generating means which receives a synchronization signal generated by the GPS device from time information which is contained in the GPS information and generates an internal operation clock of the own device according to the synchronization signal.
6. The radio communication device according to claim 5, wherein:
 - the node device comprises means for generating a self clock and means for extracting a clock from a radio communication channel in an associated section to take it as a line clock; and
 - the clock generation means comprises means for selecting one of the internal operation clock generated from the time information, the self clock and the line clock.
7. The radio communication system according to claim 1, wherein:
 - the control signal generation means comprises:

arithmetic means for calculating a direction of the antenna according to the position information received from each node device so that centers of antennas of the respective radio units of both of the mutually neighboring node devices are faced to each other; and

antenna direction adjusting control signal generation means for generating an antenna direction adjusting control signal for adjusting the antennas of the respective radio units of both of the node devices to direct them in the calculated antenna direction; and

the control means comprises:

antenna direction adjustment means for adjusting the direction of the antenna of the radio unit of the own node device according to the antenna direction adjusting control signal received from the management device.

8. The radio communication system according to claim 7, wherein:

the radio unit has azimuthal direction rotating means and elevational direction rotating means which respectively rotate the antenna in an azimuthal direction and an elevational direction; and

the antenna direction adjustment means comprises means for driving the azimuthal direction rotating means and the elevational direction rotating means to respectively rotate the antenna in the azimuthal direction and the elevational direction according to the antenna direction adjusting control signal.

9. The radio communication system according to claim 1, wherein:

the control signal generation means comprises:

radio level arithmetic means which calculates an optimum radio level of each radio unit of neighboring node devices corresponding to a distance between the neighboring node devices according to the position information received from the respective node devices; and

radio level adjusting control signal generation means which generates a radio level adjusting control signal for adjusting radio levels of the radio units of the neighboring node devices to the calculated radio levels respectively; and

the control means comprises radio level adjustment means which adjusts the radio level of the radio unit of the own node device according to the radio level adjusting control signal received from the management device.

10. The radio communication system according to claim 9, wherein the radio level is at least either one of the transmission level and the reception level.

11. The radio communication system according to claim 1, wherein the management device comprises:

a map database which stores electronic map data on an installation area of the node devices; and

display control means which displays node icons of the pertinent node devices at the pertinent positions on the electronic map according to the position information received from the node devices.

12. The radio communication system according to claim 11, wherein:

the node device comprises means for sending node identification information about the own device to the management device; and

the management device comprises means for displaying the node identification information together with node icons corresponding to the node devices according to the node identification information received from the node devices.

13. The radio communication system according to claim 11 or 12, wherein:

the node device comprises:

connection recognition means which recognizes a connected relation between

the own node and an adjacent node device; and

connected state information transmission means which sends connected state information showing the recognized connected relation to the management device; and
the management device comprises:

connection management means which manages normal connected relation information between node devices being managed;

judging means which compares the connected state information received from the respective node devices and the connected state information managed by the connection management means and judges connected states between the respective node devices; and

connected state drawing means which draws lines indicating the connected states of the respective node devices between node icons corresponding to the respective node devices according to the judged result obtained by the judging means.

14. The radio communication system according to claim 13, further comprising means for alarming a mis-connected state when the judging means judges that the respective node devices are in the mis-connected state.

15. The radio communication system according to claim 1, wherein the node device is an ATM communication device for communicating by an asynchronous transfer mode (ATM) transmission system, and the entire network is configured by an ATM network.

16. A radio communication system which disposes a plurality of node devices each provided with a radio unit which includes an outdoor device installed outdoors and an indoor device installed indoors and connected to the outdoor device through a coaxial cable and, realizes communications between the respective node devices as the respective node devices perform radio communications with neighboring node devices;

wherein:

the node device comprises a GPS device which inputs GPS information sent from a GPS satellite and received by a GPS antenna;

the GPS antenna is installed outdoors; and

the GPS information received by the GPS antenna is input to the GPS device through the outdoor device, the coaxial cable and the indoor device.

17. The radio communication system according to claim 16, wherein:

the outdoor device comprises multiple separation means which superimposes the GPS information received by the GPS antenna on a communication signal with the neighboring node device and sends to the coaxial cable; and

the indoor device comprises multiple separation means which separates the GPS information from the signal being sent through the coaxial cable and inputs to the GPS device.

18. A radio communication system which disposes a plurality of node devices having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, wherein:

the node device comprises:

a GPS device which inputs GPS information received from a GPS satellite; and

clock generation means which generates an internal operation clock of the own device according to a synchronization signal generated from time information contained in the GPS information by the GPS device.

19. The radio communication system according to claim 18, wherein:

the node device comprises means for generating a self clock and means for extracting a clock from a radio communication channel between associated sections to

take as a line clock; and

the clock generating means comprises means for selecting either one of the internal operation clock generated from the time information, the self clock and the line clock.

20. A radio communication system comprising a network structure which arranges a plurality of node devices each having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, and a management device for managing the network via at least one of the node devices, wherein:

the node device comprises:

a GPS device which inputs GPS information received from a GPS satellite;

transmission means which sends position information generated by the GPS device to the management device; and

antenna direction adjusting means which adjusts a direction of the antenna of the radio unit of the own node device according to antenna direction adjusting control signal generated by the management device according to the position information; and

the management device comprises:

arithmetic means which calculates directions of the antennas according to the position information received from the respective node devices so that centers of the antennas of the respective radio units of both of the mutually neighboring node devices are faced to each other;

antenna direction adjusting control signal generation means which generates the antenna direction adjusting control signal for adjusting the antennas of the respective radio units of both of the node devices to face them in the calculated antenna direction; and

control signal transmission means which sends the generated antenna direction adjusting control signal to the pertinent node devices.

21. The radio communication system according to claim 20, wherein:

the radio unit has azimuthal direction rotating means and elevational direction rotating means which respectively rotate the antenna in an azimuthal direction and an elevational direction; and

the antenna direction adjustment means comprises means for driving the azimuthal direction rotating means and the elevational direction rotating means to respectively rotate the antenna in the azimuthal direction and the elevational direction according to the antenna direction adjusting control signal.

22. A radio communication system comprising a network structure which arranges a plurality of node devices each having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, and a management device for managing the network via at least one of the node devices, wherein:

the node device comprises:

a GPS device which inputs GPS information received from a GPS satellite;

transmission means which sends position information generated by the GPS device to the management device; and

radio level adjusting means which adjusts a radio level of the radio unit of the own node device according to a radio level adjusting control signal generated by the management device according to the position information; and

the management means comprises:

radio level arithmetic means which calculates an optimum radio level of the respective radio units of both of the node devices corresponding to a distance between both of the node devices according to the position information received from the respective node devices;

radio level adjusting control signal generation means which generates the radio

level adjusting control signal for adjusting the radio levels of the radio units of both of the node devices to the calculated radio level respectively; and

control signal transmission means which sends the generated antenna direction adjusting control signal to the pertinent node devices.

23. The radio communication system according to claim 22, wherein the radio level is at least either one of the transmission level and the reception level.

24. A radio communication system comprising a network structure which arranges a plurality of node devices each having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, and a management device for managing the network via at least one of the node devices, wherein:

the node device comprises:

a GPS device which inputs GPS information received from a GPS satellite; and

transmission means which sends position information generated by the GPS device to the management device; and

the management device comprises:

a map database which stores electronic map data on an installation area of the node devices; and

display control means which displays node icons of the pertinent node devices at pertinent positions on the electronic map according to the position information received from the node devices.

25. The radio communication system according to claim 24, wherein:

the node device are further comprises means for transmitting node identification information on the own device to the management device; and

the management device comprises means for displaying the node identification

information together with node icons corresponding to the node devices according to the node identification information received from the node devices.

26. A radio communication system comprising a network structure which arranges a plurality of node devices each having a radio unit and performs radio communications of the respective node devices with their neighboring node devices to realize the communications among the respective node devices, and a management device for managing the network via at least one of the node devices, wherein:

the node device comprises:

a GPS device which inputs GPS information received from a GPS satellite;

connection recognition means which recognizes a connected relation between the own node and the adjacent node devices;

transmission means which transmits position information generated by the GPS device and connected state information showing a connected relation recognized by the connection recognition means to the management device;

the management device comprises:

a map database which stores electronic map data about an installation area of the node devices;

display control means which displays node icons of the pertinent node devices at the pertinent positions on the electronic map according to the position information received from the node devices;

connection management means which manages normal connected relation information between the node devices being managed;

judging means which compares the connected state information received from the respective node devices and the connected state information managed by the connection management means and judges connected states between the respective node devices; and

connected state drawing means which draws lines indicating the connected

states of the respective node devices between the node icons corresponding to the respective node devices according to the judged result obtained by the judgment means.

27. The radio communication system according to claim 26, wherein:
 - the node device further comprises means for transmitting node identification information about the own device to the management device; and
 - the management device comprises means for displaying the node identification information together with the node icons corresponding to the pertinent node devices according to the node identification information received from the node devices.
28. The radio communication system according to claim 26 or 27, further comprising means for alarming a mis-connected state when the judging means judges that the respective node devices are in the mis-connected state.